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DOMINION OF CANADA  
DEPARTMENT OF RAILWAYS AND CANALS  
HIGHWAYS BRANCH

Bulletin No. 2

# PROGRESS OF CANADIAN HIGHWAY CONSTRUCTION

Report of Chief Commissioner of Highways  
For Fiscal Year ending March 31

1922

*(As reprinted from Annual Report of the Department of Railways and Canals)*



Ottawa  
F. A. ACLAND  
Printer to the King's Most Excellent Majesty  
1922



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DEPARTMENT OF RAILWAYS AND CANALS  
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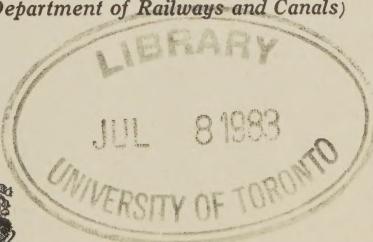
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## INTRODUCTION

In accordance with the policy of the Dominion Highways Branch to render available to all interested in the development of highways throughout the Dominion the fullest possible information as to the progress of highway construction throughout Canada as a whole, the following report of the Chief Commissioner of Highways is reprinted from the annual report of the Department of Railways and Canals for the fiscal year ending March 31, 1922.

Its reproduction in bulletin form renders possible a much wider circulation throughout the various provinces, among provincial officials, district engineers, road superintendents, supervisors, municipalities, and others interested in highway construction and maintenance, and also to an interested and helpful press, than is possible in the more general and bulky report of the department.

In this way, the Dominion Highways Branch hopes to secure a more general appreciation of the national scope of the Canada Highways Act, and of the importance of the interprovincial aspects of Canadian highway development.

A. W. CAMPBELL,  
*Chief Commissioner of Highways.*

OTTAWA, November 30, 1922.

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## REPORT OF A. W. CAMPBELL, M.E.I.C., CHIEF COMMISSIONER OF HIGHWAYS

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Major GRAHAM A. BELL, C.M.G.,

Deputy Minister,

Department of Railways and Canals,  
Ottawa.

SIR,—During 1919 and 1920 the mileage of highway construction and improvement placed under contract by the different provinces was definitely restricted by the consideration of cost. Until the fall of 1920 unprecedented rates for labour and materials mounted. Consequently the amount of work completed with Federal aid prior to 1921 is largely accounted for by the fact that it was possible for the Provincial Departments of Highways to carry out extensive preliminary construction operations, economically with their own equipment under provincial engineers directing labour forces.

The year 1921 was exceptionally favourable for the carrying out of an accumulated programme of work. Although one or two of the provinces still regarded prices as too abnormal to justify the awarding of contracts on anything but the most urgent work, the marked decline in rates led to the submission to the department of numerous project statements from different provinces for approval of proposed immediate or early construction on projects, some of which had been held in abeyance for years. Surveys had been made, plans and estimates prepared, and all was in readiness for the call of tenders. Another factor facilitating work was a greater availability and hence greater efficiency in the labour offering. The weather contributed also in making it possible for the different Provincial Departments of Highways to extend weekly their mileages of widened, drained and generally improved highways. The amount of construction and improvement work undertaken and completed by each province in connection with the Canada Highways Act during the year 1921 was very creditable. For reasons indicated, this was the first year when all the provinces with the exception of Alberta were fully operating with Federal assistance.

The number of contractors interested in highway construction projects has increased very considerably since 1919. While the greater abundance of labour units and better prices of materials tended to stability of construction conditions, and to the creation of confidence, in contractors, other reasons explain their increase in numbers. More costly operations, requiring special equipment designed to build a specified type of pavement, and the placing of longer mileages of work for such operations as grading, under construction, have led to much tendering for such work by ex-railway contractors, whose constructural and administrative experiences have been found to be invaluable aids in attempting to solve Canada's highway transportation problem. Moreover, the clause in the Federal highway legislation of 1919 requiring all expenditures in connection therewith to be made by the contract method of construction, except for good reasons and by consent, has had a noticeable effect in this connection, and not alone in regard to projects being improved with Federal aid.

The method of construction of highway projects is one of the debatable problems constantly before administrators of highway legislation. Theoretically the advantages of having all construction operations performed by the contract method are plain. It tends towards definiteness of work, because plans based upon careful surveys to determine the amount of work involved are necessary, unit estimates as a guide to proper costs are customary, and definite specifications are the rule. Again perform-

ance records of labourers are generally higher under the contract method. The fact that contractors have no regard to the personal affiliations or connections of the labour offering, and being employed is a consideration of weight with many administrators. The elimination of any form or degree of favouritism not alone in fact to labourers, but also to contractors, is generally recognized as being in the public interest. An alert public interest in the efficiency of all forces publicly employed, and in the value given for the comparatively high costs necessarily incurred for the improvement of primary public highways has widened as responsibility for their condition has increased from being of practically purely local concern, to a matter of national moment.

There are, however, certain considerations in favour of the day-labour method of procedure of meeting modern demands for public highway transport service. For example, some equipment required for the proper maintenance of improved roads, work the Provincial Departments of Highways themselves must do, is of equal value for construction purposes. In fact the possibility of prompt maintenance work is one of the reasons leading to the installation of late by a number of Canadian cities of their own paving plant. It is in accord with business principles that a province operate for instance a bituminous pressure distributor during the summer months in making constant applications as required of dust palliatives and light bituminous road binders, and then at suitable, if limited, occasions use it for construction work. Teams required for grading or dragging can be economically used in drawing surfacing materials, etc. Again some of the modern road-building equipment is so costly that few contractors can afford to secure it. For such reasons, the applications of some departments for approval of their proposal to construct some portion or all of a project by days labour, and with their own equipment, have been allowed as being quite valid and reasonable. When method other than tender and contract is proposed in applications for Federal aid, full and adequate explanations have been required. Insistence upon the full information supplied by surveys, even when the work may be done by days labour, overcomes a defect formerly associated with this method.

A letter to the different Provincial Deputy Ministers of Highways asking for expressions of opinion regarding the desirability of awarding highway contracts when labour is most slack, with a view to relieving unemployment, securing better prices for operations, and enabling contractors to get their equipment and portable materials on the ground when rates of transportation are lowest, brought generally favourable responses. While the general practice appears to have been to let contracts in the late spring months, the advantage of having plenty of time between the calling of tenders and the award of contracts, so as to enable all contractors interested to become familiar with the proposed work, which in the rush of the spring months is not always possible, was also referred to by some provincial deputy ministers.

Longer seasons for highway construction operations have been occasioned by the fact that the development of road traffic has so greatly exceeded the normal rates and degrees of construction and improvement. In order to meet partially the needs of modern traffic, road-work should be carried on actively during every month of the year. At present in Canada, frost conditions and financial limitations alone preclude this from being done. As such work as bituminous penetration and bituminous concrete can be done only in warm weather, the working season for such types of construction is limited to four or five months of the year. Where provincial finances will permit, the work of grading, collection and preparation of materials and surfacing with metal is being carried on from seven to ten months of the year.

The usage of and wear on primary and secondary roads has of late become much greater than formerly both by reason of the modern road vehicle and of changes in industrial conditions. The roads suffer not alone from the numbers, weight, capacity and speed of motor vehicles, but also because industries are drawing their supplies

from larger zones. Decreases in many districts in the numbers of local grist-mills, saw-mills, creameries, and increases in the capacity of the central mill or market have necessitated longer hauling distances for local producers, and where road surfaces and equipment permit, heavier loads. The adequacy of any road is relative to traffic conditions, but experience with improved roads shows that being relatively few in number, they soon draw a traffic out of proportion to that using them when unimproved. A certain margin of extra support for the unknown traffic that may be expected to use main trunk routes is therefore found to be a judicious provision in building them.

On a number of the main trunk highways recently improved, there have been established public carrier motor bus lines, particularly between urban centres, summer resorts and other places not being served by steam or electric railways. In this connection, where the approaches to cities and towns have been improved with modern pavements, extensions of suburban limits are familiar in different provinces, followed by motor-bus auxiliaries to established transportation lines. The volume of traffic from a large city to another may be represented by two elongated letter V's, joined at the base. Hence a policy of building massive foundations and structures and durable surfaces for short distances at the approaches of large centres of population and then tapering the character of finishing, more or less according to the present volume of traffic is a reasonable and conservative plan of development of highway transport facilities.

As highway traffic and rates of travel increase, the question of accident prevention assumes increased importance. Road surveys are therefore taking on a wider meaning to include proper provision for the public safety. In the actual construction of roads, such measures include the widening of travelled surfaces, the enlargement of curves at turns, the improvement of lines of sight by straightening locations, cutting down brush and shrubbery at crossings, etc., the elimination of dangerous level highway-railway crossings, and the placing of standard signs of direction and danger on all improved roads.

Within the last year, several highway-railway crossings on Federal aid projects have been avoided by changes of location of the highway. Where a railway has cut across an old road at numerous points, relocation of the highway is the most effective method of eliminating level crossings.

Some months ago the Board of Railway Commissioners of Canada asked for a conference with representatives of the different provinces and this department to discuss public safety measures, particularly at approaches to railway crossings. The conference adopted a resolution to the effect that it was of opinion that the percentage of Federal aid, namely, 25 per cent of the cost of grade separations, authorized by subsection 2, section 262 of the Railway Act, 9-10 George V, is insufficient; and that the maximum amount of the Federal contribution to such separations does not sufficiently relieve local municipalities, where 25 per cent of the cost would exceed \$15,000, the maximum total authorized. The number of accidents at railway crossings, in Canada, together with the number of crossings still unprotected constitute reasons for believing many municipalities hesitate to avail themselves of Federal aid to grade separations, owing to the amount of expense that would be entailed upon them under existing legislation, passed at a time when such costs were much lower than they would be to-day.

Another resolution of this conference favoured some amendment to the Criminal Code, or the Railway Act, providing for penalties for non-compliance with warning signals. That such a law would in time prove to be a salutary deterrent to heedless motor driving is manifest. Unfortunately as yet there has not been general agreement as to standard uniform designs of signals to warn and direct highway traffic on the roads of the different provinces. When uniformity of form, colour and lighting, of danger and direction highway signals shall have been established, non-compliance on the part of traffic might more properly be made a summary offence.

*Practically impossible*

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CONDITIONS IMPOSING COSTS OF HIGHWAY CONSTRUCTION ON MAIN ROUTES CALLING FOR  
FEDERAL AID

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Until a few years ago, almost all public highways, and particularly rural roads had a single track line travel only. There was little necessity for constructing double or triple track roads, because the traffic was light, slow-moving, and might easily pause and turn out of the beaten track to allow traffic bound in an opposite direction to pass. Provision for such traffic must now be supplemented by more costly work for the new traffic.

Comparatively recent increases in the numbers and speed of some traffic, amounting in each case, on the main highways, to approximately 400 per cent, necessitate the construction of improved roadways, permitting two processions of vehicles travelling in one direction, at different rates of travel, and also room for at least one procession going in the opposite direction. The roadways of the country should be generally widened; but on main trunk routes, the importance of widening is urgent.

The work of widening the old main routes includes filling in the old ditches, building new drainage outlets, wide culverts and grading to a new crowning radius, generally less acute. Such work is necessary, whether anything is put on the surface of the road or not, whether located in Ontario, or Alberta. In the provinces where road-metal is difficult to obtain, the widened and graded road is an improvement received with satisfaction, and is all that can presently be provided.

In the older provinces, however, in which may be included Manitoba, it is to be expected that gravel deposits should be used in varying degrees of width and thickness, wherever possible. Some of the advantages and limitations of such construction are referred to hereafter.

Where good gravel is not obtainable in such provinces, and rock is abundant, the broken stone road is a type which in the past has been regarded as second to none. Before the general adoption of motor vehicles, there had been constructed in the provinces of Ontario and Quebec, many miles of single track water-bound macadam roads, which with slow-moving traffic, have given splendid service. But as the action of pneumatic tires on this type of construction is to rend the bond made between the water and the stone fragments, and to cause all the finer material to become ravelled, and eventually blown away, such construction has now become inadequate to present day needs. Where such traffic is heavy, water-bound macadam construction soon becomes filled with holes and very rough, and the dust formed by the shear and impact of the tires leads to the inevitable mud holes and clouds of dust.

The next step in the improvement of all roads that will be required to sustain fast long distance traffic has been the addition by mixture or super-imposition of some more effective binding agent than water, between the metal fragments, such as Portland or bituminous cement. The construction of leading roads has become more costly initially because in addition to wider grades, on better locations, the use of mineral aggregate, of the best quality, in combination with a prepared binder, is an economic necessity.

Increasing costs of maintenance of the plain untreated gravel and broken stone highways have lead, as far as practicable, to a general adoption of a policy of constructing the entire road so that repair and maintenance shall be reduced to the minimum. These types include Portland cement concrete, asphaltic cement concrete, tarry cement concrete, and bituminous macadam by the penetration method. It may be that the future will provide a cement for road-building purposes that will be yet more efficacious, and satisfactory.

STATEMENT OF TYPES OF CONSTRUCTION PROPOSED ON FEDERAL AID PROJECTS  
PLACED UNDER AGREEMENTS DURING FISCAL YEAR 1921-22

Province	Earth	Gravel	Water-Bound Macadam	Slag Macadam	Bit. Macadam	Asphaltic Concrete	Cement Concrete	Total
British Columbia.....		201.061				8.88	7.039	216.980
Manitoba.....		764.7000						764.700
New Brunswick.....		1,223.700						1,237.200
Nova Scotia.....		133.54	14.43	8.20	13.50			162.460
Ontario.....		27.77	27.45		6.29			70.95
Prince Edward Island.....	118.25							118.25
Quebec.....		68.889			14.107			82.996
Saskatchewan.....	1,125.50							1,125.50
Total.....	1,243.75	2,350.771	110.769	8.20	33.897	12.42	19.229	3,779.036
Per cent.....	32.92%	62.20%	2.93%	0.22%	0.89%	0.33%	0.51%	100%

GRAVEL CONSTRUCTION

It will be observed that sixty out of every one hundred miles of all projects placed under agreement during the year for Federal aid were for gravel construction, which varied in width of grade, metalling and in thickness. On some eastern main trunk highways, the gravel covered the full width of the roadway, 20 feet to 24 feet, with a thickness at centre up to 14 inches, while on some western trunk highways, a single track of gravel surfacing, 4 inches in thickness, followed for two successive years by similar applications, is all that can be provided.

The relatively low percentage of water-bound macadam construction proposed for construction with Federal aid, during the year 1921-22, suggests a brief inquiry into the relative merits and disadvantages of these two types, namely gravel, and broken stone bonded with the aid of water, having regard to new traffic conditions.

For definitive purposes, it may be observed that scientifically there is no line of demarcation between gravel and sand, or between sand and silt. For construction purposes, however, a line is arbitrarily drawn on the basis of the size of the particles. Gravel is then regarded as the particles retained on a 10-mesh sieve; sand, those passing a 10-mesh sieve, and retained on a 200-mesh sieve; and, silt or dust, those passing a 200-mesh sieve, and retained on a 500-mesh sieve. Stone can be broken and ground into any desired sizes.

Again there are two general classes of gravel deposits, viz—bank gravel and beach gravel. Bank gravel is found in natural deposits usually to a greater or lesser extent intermixed with sand or clay. Beach gravel is usually found on the shores of streams, lakes or the sea. It is particularly noticeable of bank gravel that no two deposits are apt to have the same characteristics. This fact has been definitely determined by numerous tests by the Department of Mines, and other laboratories for conducting tests on road materials. Hence modern highway specifications are calling for the use of gravel with definite qualities of hardness, toughness, cementation values, etc.

For ordinary road work, bank gravel, and sometimes rather unfortunately, "the run of the pit," is usual, as this type has at least sufficient, that is 15 to 20 per cent of binding material, in the form of clay or sand, to cause the road to become consolidated, under the action of traffic.

For the types of surfacing required to sustain heavy modern traffic, the use of local materials, none of which is more generally prevalent than gravel, in combination with proper cements, is becoming an economic necessity. As such gravel must be absolutely clean in order that the cement may adhere, beach gravel is now in demand for use in Portland and bituminous cement mixtures for paving purposes. The results are quite satisfactory, with experienced proportioning, and application.

But for ordinary traffic, in order to keep the wheels out of mud of varying depths, for many years past, the use of some kind of gravel has, in all the provinces favoured with natural deposits, been general. Gravel from natural deposits close to road locations has helped to sustain most of the marketing traffic from production centres of the central provinces, for a quarter of a century. Though usually of single track width, only, the gravel roads of the older provinces have given excellent service and wear, especially when regularly dragged and taken care of.

The next development was the use of broken stone, on the more heavily travelled roads of the provinces, with which by the aid of rollers and sprinkling wagons, a pavement with a set formed by an interlocking and keying together of the fragments was built. But as indicated above there would appear to be reasons why this type of pavement, except for ultimate surfacing with some more satisfactory wearing course, is not being favoured of late. One explanation is the difference in origin, and therefore in their values for road-building purposes, of the original rock of most bank gravel and beach gravel deposits in Ontario.

Most bank gravel deposits of southern Ontario have evidently come from igneous formations of the north, and show a large percentage of hard tough fragments, of superior qualities for road-building purposes. But most beach gravel found for example on the shores of lake Ontario has apparently been recently formed from the limestone rocks which form the escarpment of the lake. Limestone formations constitute the principal sources of broken stone supplies for road-building purposes in Ontario—*material which easily fractures and wears*. The best stratified rock is much inferior to average igneous work for highway work. Hence any comparison between gravel roads, on the one hand, or between gravel and broken stone roads on the other, must properly have regard to the origin and characteristics of the fragments, as well as variations in their application to the road.

From its very nature, gravel of igneous origin, after screening to remove excess quantities of clay or sand, should be most suitable for road-building purposes. It has been formed by the forces of nature some-times as with rude mortar and pestle, so as to wear away the rough corners and leave only those particles which, when applied to the uses of man, will, without further breaking up, take a great amount of abrasive action. Broken stone, on the other hand, unless made from naturally hard, tough rock, is apt to break, more especially when made by "jaw" crushers into shapes lending themselves to further disintegration, under the action of traffic or rollers.

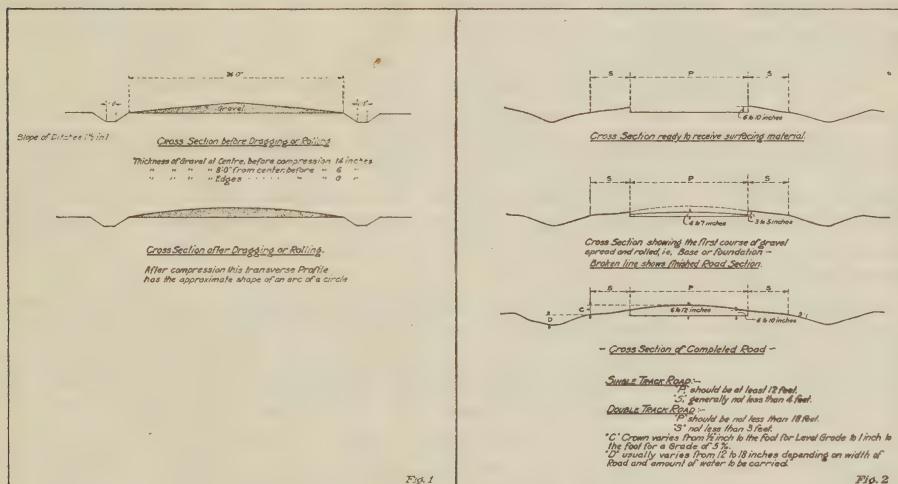
Incidentally, it may be observed a difference between the practice of the first builder of broken stone consolidated roads, Macadam, and recent practice attempting to build "macadam" roads is noticeable. Macadam broke under the hammer, hard rock into cubical fragments, of the size of his fist, and then took pains to see that the fragments keyed together. Roads are now being formed of light jaw-crusher formed fragments of lime schist, sand and other poor road-building rocks, which, when applied to the road, are rolled until crushed into strata of dust, which hinder the interlocking process, particularly necessary under the suction action of pneumatic tires.

The popular advantage of gravel is that it is cheap, when easily available. Some surveys have been undertaken by the provinces of Ontario, New Brunswick, and Nova Scotia, with a view to the locating of good gravel deposits, close to some main trunk routes being improved with Federal aid. In this connection, reference may be made to the fact that arrangements with the Topographical Surveys Branch of the Interior Department were made at the beginning of last season's work, to the end that Federal Government land surveyors take note of all gravel deposits in the western provinces. The number and extent of their discoveries to date is rather surprising, in provinces where gravel was generally supposed not to exist. These deposits are often unfortunately quite remote from transportation facilities.

The gravel road is difficult to consolidate, but when this has been completed, the road is comfortable for riding, at once resilient, and of easy traction.

Wearing under traffic less than a water-bound macadam road, the gravel road is usually less dusty, without treatment. Once built, however, the gravel road is more difficult to treat or to reconstruct with a bituminous penetration surface than the broken stone road. The dust and dirt adhering to the rounded fragments of the gravel will prevent a proper coating of the bitumen.

The gravel road requires more maintenance attention than a water-bound macadam road, but this work is more easily done on the former. When the maintenance work on a gravel road becomes costly, it is found to be good practice to lay a heavy coat of broken stone, or washed gravel, and treat it with a good bituminous binder. When it is anticipated, however, that traffic will be very heavy, capping the reformed gravel base with a light cement concrete course, with or without a superficial bituminous wearing surface, is a justifiable development. Some cementitious material must be added to a gravel or W.B. macadam road, to prevent disintegration and dust when the traffic is in excess of 100 motor vehicles daily. On the lesser travelled roads, dust clouds are being prevented by the use of light asphaltic oils and tars and calcium chloride. Advocacy of the use of calcium chloride as a temporary binder and dust preventive on gravel roads is increasing.



Gravel roads are constructed according to the feather-edge, trench, or combination methods.

The feather-edge method (Fig. 1) is that usually followed in the past, when the work has been under the direction of experienced road builders, that is to say, when definite method is employed. In this case the thickness of the gravel varies from 14 inches at the centre to 6 inches at points on either side, 8 feet from the centre, to nothing at the edges. The method is customary when the thickness of gravel is from 4 inches to 6 inches. When greater thicknesses are to be applied, it is good practice to build the road according to either the trench (Fig. 2) or combination method, that is so that the base course will be in a trench, and the wearing course feather-edged. Such construction permits of more thorough bonding of the gravel.

The cost of excavating a trench, or building shoulders on the flat or graded roadway, as the case may be, is somewhat offset by the amount of gravel saved over that when the feather-edge method is employed. For about two-thirds of the desired width of the finished metalling, the bottom part of the road is trenched in accordance with the method familiar to builders of water-bound macadam construction. Therein are placed the larger gravel stones; and, after the large voids have been filled with finer material, the bottom course is gone over with a heavy drag or roller. Then the

wearing course is applied, and shaped in accordance with the feather-edge method. Thus in the combination method the material is graded and confined to the places where it will give the greatest service.

The crown on a gravel road should not be excessive, as this results in keeping traffic in the middle of the road, and rut formations. As traffic is distributed, the life of any road is prolonged.

#### HIGHWAY RESEARCH

In connection with various problems related to highway constructions, finance, and maintenance, to indicate some of the directions in which definite information is lacking, is to present the evident necessity in the public interest, of there being undertaken a rather wide field of investigation and research. After the inevitable waste from experimental work, some of these problems have been solved by individual investigators. Unfortunately, however, the results of various experimental processes and methods of highway work have not been so recorded as to be of general information. Hence in accordance with the suggestion of different Provincial Departments, this branch has undertaken to act as a clearing house for information on highway location, design, construction, maintenance, finance, etc., and to encourage directly and indirectly work of investigation and research, and to some extent, standardization in road-building materials.

Some of the subjects in which highway engineers are not agreed, and in which research is necessary are: the causes of waving of gravel and of bituminous mixtures, of "cracking," in Portland and bituminous concrete pavements, and of the formation of "cup" holes and pockets, in wearing surfaces; desirable ingredients and proportions of materials, such as "filler", in the less common designs and practices of construction; proper number and thicknesses of applications, etc. Collection of information regarding costs of the different operations, and distribution of accounts, is also in demand.

In regard to the relation of the vehicle to the road, it may be noted that statements for example in applications for Federal aid as to the amount of traffic now using the road give the numbers only of motors, and horse drawn vehicles. Numbers do not give much definite information regarding the weight of traffic to be sustained, owing to the variety in weight and capacity of the modern road vehicle. To be of value, traffic censuses should be conducted with more precision and accuracy than is generally the case, and to this end, some other measure than number should be agreed upon as the unit of traffic.

Other points which should be developed in connection with the vehicle and the road, are the determination of suitable ruling grades, and minimum resistances on different types of construction, for stated classes of traffic; the distribution of traffic on the road; desirable limitations on loads per axle and inch of tread, having regard to a standard of each type of modern construction, reasonable seasonable limitations, safety measures, etc.

Some progress is being made by this branch in the collection of full information as to provincial highway and vehicular legislation, regulations, organization, machinery and methods in relation to highway transport.

Particular attention is being given to provincial and municipal systems of maintenance of public highways. It is recognized that, as the amount of money being raised and expended for new construction, reconstruction and the improvement of old roads increases, the importance of protection of such investments, by proper organizations for maintenance, becomes greater. A bulletin on "Highway Maintenance Methods and Costs", is in course of preparation, dealing with systems of maintenance in vogue in the different provinces and elsewhere.

The field for standardization, experimentation and research in highway transport subjects in the Dominion is so wide that co-ordination alone involves considerable study.

SUMMARY OF PROJECTS, PLACED UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT AND THE VARIOUS PROVINCES

(From April 1, 1921, to March 31, 1922)

Province	Number of Projects	Mileage	Total estimated cost	.40 p.c. of estimated cost	Average cost per mile
Prince Edward Island.....	12	118.25	\$ 211,495 00	\$ 84,598 00	\$ 1,781 00
Nova Scotia.....	20	162.16	1,788,252 18	715,300 87	11,007 34
New Brunswick.....	19	1,237.20	2,950,600 00	1,180,240 00	2,383 36
Quebec.....	5	82.996	859,367 96	343,747 18	10,354 33
Ontario.....	8	70.95	1,790,218 65	716,087 46	22,113 00
Manitoba.....	9	764.70	3,478,902 15	1,391,560 86	4,549 37
Saskatchewan.....	21	1,125.50	1,356,888 88	542,755 55	1,205 59
Alberta.....					
British Columbia.....	5	216.98	1,877,732 10	751,092 84	8,654 00
	99	3,779.036	14,313,456 92	5,725,382 76	3,777 60

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT AND THE PROVINCE OF PRINCE EDWARD ISLAND

(March 31, 1922)

Project No.	—	Mileage	Total estimated cost	Type of construction	Widths
12	Commercial Road (Murray River to Montague).	10.00	\$ 15,875 00	Earth.....	18G-14P
13	Cardigan-St. Peters (Cardigan to St. Peters)	13.00	17,600 00	" .....	18G-14P
14	St. Peters (St. Peters to Lot No. 40, Kings Co.).	8.50	12,000 00	" .....	18G-14P
15	St. Peters (Union Road to Scotchfort, Kings Co.).	11.50	19,000 00	" .....	18G-14P
16	Malpeque Road (Waterworks Hill to Hunter River).	11.50	20,600 00	" .....	18G-14P
17	Tryon Road (Newhaven to Tryon, Prince Co.).	15.50	24,345 00	" .....	18G-14P
18	Eel Creek Road (Irishstown to French River)	6.50	10,300 00	" .....	18G-14P
19	Bedeque Road (Summerside to Borden)....	15.50	20,100 00	" .....	18G-14P
20	Western Road (Mount Pleasant to Mis-couche).	14.50	35,550 00	" .....	18G-14P
21	Western Road (O'Leary to Bloomfield).....	6.00	17,700 00	" .....	18G-14P
22	Malpeque Road (Charlottetown to Water-works Road).	3.00	11,300 00	" .....	18G-14P
23	St. Peters Road (Charlottetown to Union Road).	2.75	7,125 00	" .....	18G-14P
		118.25	\$ 211,495 00	118.25	

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT  
AND THE PROVINCE OF NOVA SCOTIA

(From April 1, 1921, to March 31, 1922)

Project No.	Location of Project	Mileage	Total estimated cost	Type of construction	Widths
1	Bedford Road (Halifax City Line and Sackville River Bridge).	6.29	\$ 251,000 00	Macadam-Tar via.	30G-16P-3S
4	Port Joli-Sable River Road.....	6.30	91,227 76	Gravel.....	20G-14P
7	Liverpool-Caledonia Road.....	5.30	67,321 00	.....	20G-12P
8	Reserve Road (Sydney to Glace Bay).....	8.20	91,795 30	Slag Macadam.....	20G-12P
9	Windsor-Hantsport Road.....	6.48	63,032 00	Gravel.....	18G-14P
10	Weymouth-Meteghan Road.....	10.00	58,097 26	“.....	20G-16P
13	Waverley-Elmsdale Road.....	16.20	84,060 25	“.....	20G-14P
14	Milford Road (Elmsdale to Shubenacadie).....	3.48	27,865 51	“.....	20G-14P
15	Shubenacadie-Stewiacke Road.....	2.46	18,153 54	“.....	24G-14P
16	Truro-Glenholme Road.....	12.12	97,720 05	“.....	18G-14P
17	Amherst-N.B. Boundary Road.....	1.00	42,947 85	“.....	22G-12P
18	New Glasgow-Truro Road.....	7.85	72,024 09	“.....	20G-14P
19	New Glasgow-Telford Road Sec. "A" (New Glasgow Town Line towards Antigonish)	10.05	128,130 64	“.....	22G-14P
20	Antigonish-Mulgrave Road— Sec. "A" (Antigonish to Lower South River Bridge). Sec. "B" (Lower So. River Bridge to Ponquet Road). Sec. "F" (From Guysboro Co. Line 5 miles). Sec. "G" (From a point 5 miles from Guysboro Co. line to Mulgrave Town line).	3.71 5.46 5.00 5.53	31,093 30 64,247 62 71,936 00 90,070 20	“..... “..... W. B. Macadam “.....	24G-14P 24G-14P 16G-15P 16G-15P
22	Woods Harbour-Shag Harbour Road.....	5.21	56,721 00	Gravel.....	18G-14P
23	Hants County Line-Mt. Uniacke Road.....	3.90	47,149 80	W. B. Macadam	20G-14P
24	Port Hawkesbury-Kempt Road (Hawkesbury Town Line towards Kempt Road).	10.00	122,702 50	Gravel.....	24G-14P
25	St. Peters-Sydney Road— Sec. "F" (Big Pond 8.92 miles towards East Bay). Sec. "H" (Sydney to a point 6 miles towards East Bay).	8.92 6.00	44,747 64 37,091 85	“..... “.....	22G-12P 20G-12P
26	Sydney-Baddeck Road, Sec. "D" (Little Bras D'Or to Big Bras D'Or).	8.00	86,484 45	“.....	22G-10P
30	Parrsboro-Amherst Road, Sec. "G" (From a point 5 miles from Amherst Town Line to Amherst Town Line).	5.00	42,632 57	“.....	20G-12P
		162.46	1,788,252 18		
6	Sec. "A".....		Orig. est. cost* 45,603.50	Revised 92,904.00	

\*NOTE—Placed under agreement last year.

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT  
AND THE PROVINCE OF NEW BRUNSWICK

(March 31, 1922)

Project No.	Location of Project	Mileage	Total estimated cost	Type of construction	Widths
1	Metapedia-Bathurst Road.....	74.10	\$ 148,200 00	Gravel	24G-18P
2	Bathurst-Newcastle Road.....	125.60	125,800 00	Bit. Macadam-Pen. and Grav.	24G-16P
3	Newcastle-Moncton Road.....	91.50	301,950 00	Gravel	24G-18P
4	Shadiac-Port Elgin Road.....	29.40	73,500 00	"	"
5	Cape Tormentine-Aulac Road.....	30.40	50,000 00	"	"
6	Moncton-Aulac Road.....	36.00	100,000 00	"	"
7	Moncton-St. John Road.....	89.60	304,640 00	Bit. Macadam-Pen. and Grav.	24G-16P
8	St. John-St. Stephens Road.....	82.00	400,000 00	"	"
9	Penobsquis-Moncton Road.....	74.30	52,000 00	Gravel	24G-18P
10	St. John-Fredericton Road.....	58.00	207,000 00	"	"
11	Fredericton-Woodstock Road.....	61.00	326,000 00	"	"
12	Woodstock-Perth Road.....	47.40	67,900 00	"	"
13	Perth-Grand Falls Road.....	22.70	101,100 00	"	"
14	Grand Falls-St. Georges Road.....	47.50	95,000 00	"	"
16	Westfield-Oromocto Road.....	65.80	88,460 00	"	"
18	St. Stephens-Burden Road.....	63.20	105,950 00	"	"
19	Fredericton-Newcastle Road.....	96.10	198,400 00	"	"
20	Newcastle-Bathurst Road (Inland).....	42.10	53,200 00	"	"
21	Fredericton-Sussex.....	100.50	151,500 00	"	"
		1,237.20	2,950,600 00		

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT  
AND THE PROVINCE OF QUEBEC

(March 31, 1922)

Project No.	Location of Project	Mileage	Total Estimated Cost	Type of Construction	Widths
1	Montreal-Longueuil-Sherbrooke Highway— Section Q, Subsection 2 (Parish Ste. Marie-de-Monnoir Co., Rouville).	1.788	45,567 03	Mac. Tarvia treated....	24G-16P
	Section Q, Subsection 3 (Parish Ste. Marie-de-Monnoir, Co. Rouville).	1.765	36,414 64	" "	"
	Section S (Parish of Notre Dame de Bonsecour).	1.743	34,883 27	" "	"
	Section G (South Stukely Twp., Shefford Co.).	4.511	75,890 95	" "	"
5	Beauce Jct.-Sherbrooke Highway— Section C, Subsection 2 (Parish of Sacré Cœur de Jésus).	2.530	6,139 00	Gravel.....	20G-20P
	Section K (Parish of St. Joseph de Coleraine).	5.770	40,215 75	" .....	24G-20P
7	Beauceville-Sherbrooke Highway— Section L (Bury Twp. Co., Compton).	7.600	89,271 19	Gravel.....	24G-24P
	Section N, Subsections 1 and 2 (Eaton Twp., Co. Compton).	10.550	70,141 72	" .....	"
	Section O (East of Town Limit, Lennoxyville).	3.100	46,510 20	" .....	"
10	Lévis-Sherbrooke Highway— Section O (Parish of Ste. Victoire, Arthabaska Co.).	4.858	37,020 51	" .....	24G-22P
	Section R (Parish of St. Christophe).	2.384	11,791 77	" .....	"
	Section T, Subsection 1 (Warwick Twp.).	3.748	24,158 16	" .....	"
	Section T, Subsection 2 (Warwick Twp.).	4.180	19,675 20	" .....	"
12	St. Hyacinthe-Chambly Highway— Section A (Parish Notre Dame de St. Hyacinthe).	4.392	83,420 09	" .....	24G-24P
	Section B (Parish St. Damase)....	6.520	67,169 42	" .....	"
	Section C (Parish St. Michel de Rougemont).	2.707	12,637 55	" .....	"
16	Richmond-St. François-du-Lac Highway— Section C (Durham Twp., Drummond Co.).	4.750	36,035 13	" .....	24G-22P
	Section D (Parish of L'Avenir, Drummond Co.).	5.800	67,298 74	" .....	"
17	Hull-Aylmer Road— Section B (Hull Co.).....	4.300	55,127 64	Mac.-Tar. treated.....	24G-18P
		82.996	859,367 96		

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT  
AND THE PROVINCE OF ONTARIO

(March 31, 1922)

Project No.	Location of Project	Mileage	Total Estimated Cost	Type of Construction	Widths
			\$ ets.		
1	Kingston Road— Section A, Subsection 1 (Lot line 13 and 14 Westerly to lot line 26 and 27, Pickering Twp.).	3.54	159,080 00	Asphaltic Concrete.....	30G-20P
13	Talbot Highway— Section S (Alborough Twp., Elgin Co.).	10.77	156,420 00	Gravel.....	30G-20P
14	London-St. Thomas— (Section A and Subsection 1 of Section B.)	5.29	228,500 00	Cement Concrete.....	30G-18P
15	Lambeth-Maidstone— Section K, Subsection 1, Chatham City, Easterly to Lot 7).	2.00	80,493 00	Cement Concrete.....	30G-18P
16	St. Thomas-Niagara Falls Highway— Section U1 and V.....	16.05	469,077 50	W. B. Macadam.....	30G-20P
18	Hamilton-Chatsworth Highway— Section L, Subsection 1 (1 Mile south Guelph City). Section N, Subsection 1 (Puslinch Twp.).	1.00	46,356 75	Cement Concrete.....	30G-20P
20	Sarnia-Elginfield Highway— Section B (Easterly from City of Sarnia).	2.40	102,444 40	Cement Concrete.....	30G-20P
28	Bradford-Severn Highway— Sections B, E, F, G1, G2, I1, I2...	28.40	425,730 00	11.4 W. B. Mac. 17 Gravel.	30G-20P
		70.95	1,721,218 65		

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT  
AND THE PROVINCE OF MANITOBA

(March 31, 1922)

Project No.	Location of Project	Mileage	Total Estimated Cost	Type of Construction	Widths
1	Portage Highway-Brandon Road— Section A (Assiniboia, St. Francois, Xavier Portage, Laprairie Municipalities).	56.50	264,385 00	Gravel.....	18G-12P
	Section C (Elton and Cornwallis Municipalities).	17.00	89,100 00	" .....	"
	Section E (Sifton, Woodsworth and Wallace Municipalities).	63.00	85,000 00	" .....	"
2	Portage La Prairie-Dauphin Highway— Section B (Westbourne Municipality).	26.00	133,300 00	" .....	"
	Section E (St. Rose, Ochre River, Dauphin, Gilbert Plain and Grandview Municipalities).	114.00	407,400 00	" .....	"
	Section G (Shell River Municipality to Saskatchewan Boundary).	12.00	66,000 00	" .....	"
3	Swan River Valley Road— Section A (Dauphin Municipality).	23.00	92,200 00	" .....	"
	Section D (Minitonas and Swan River Municipalities).	53.00	302,100 00	" .....	"
5	Bowsman Road— Section A (Minitonas-Swan River).	27.20	171,500 00	" .....	"
7	Winnipeg-Portage Highway— Section A (Charleswood and Cartier Municipalities).	10.50	54,000 00	" .....	"
	Section C (Portage la Prairie to Poplar Point).	19.00	93,000 00	" .....	"
8	Winnipeg Boundary Highway— Section A (MacDonald and Grey Municipalities).	48.00	275,000 00	" .....	"
	Section D (Oakland, Glenwood, Sifton and Pipestone Municipalities).	86.00	300,000 00	" .....	"
9	Winnipeg Boundary Highway (South Route)— Section A (Macdonald Municipality).	33.50	294,052 15		
	Section B (Dauphin to Northerly Limit of Roland).	17.00	88,900 00	" .....	"
	Section J (Albert Municipality)....	26.00	77,550 00	" .....	"
10	The Lord Selkirk Highway— Section A (Fort Garry, Ritchot, Morris and Malcolm Municipalities).	56.00	430,000 00	" .....	"
11	Winnipeg-Riverton Road— Section A (West Kildonan to West St. Paul).	6.50	8,550 00	" .....	"
	Section B (St. Andrews Municipality).	35.60	149,000 00	" .....	"
	Section C (North of Section B to Gimli Municipality).	21.80	45,000 00	" .....	"
	Section D (Birchcroft Municipality).	13 10	52,865 00	" .....	"
		764.70	3,478,902 15		

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT  
AND THE PROVINCE OF SASKATCHEWAN

(March 31, 1922)

Project No.	Location of Project	Mileage	Total Estimated Cost	Type of Construction	Widths
1	Cadillac-Battleford Highway— Section B (Swift Current-Sask. Landing).	31.00	\$ 49,570 00	Earth.....	20G-14P
	Section D (Elrose-Rosetown).....	24.50	36,969 45	" .....	"
	Section H (North Battleford-Midnight Lake).	49.50	51,280 00	" .....	"
2	Assiniboia-Prince Albert Highway— Section F (Simpson to NE. 33-34-27-2).	48.00	56,100 00	" .....	"
	Section H (Dana to St. Louis)....	56.00	66,850 00	" .....	"
4	Fleming-Walsh Highway— Section A (NE. 1-13-30-1 to Wapella).	31.50	24,730 00	" .....	"
	Section B (Wapella to Broadview)	34.00	25,350 00	" .....	"
	Section E (McLean to Regina)....	26.00	31,564 25	" .....	"
	Section F (NE. 36-16-20-2 to Moosejaw).	39.50	27,414 99	" .....	"
	Section I (Parkbeg to Morse).....	40.00	68,778 19	" .....	"
	Section J (Morse to Swift Current)	37.00	36,050 00	" .....	"
5	Togo-Lloydminster Highway— Section D (Margo to Wadena)....	27.00	45,500 00	" .....	"
	Section F (NE. 8-37-18-2 to Humboldt).	26.00	39,000 00	" .....	"
6	Section N (Maidstone to Waseca)....	10.00	11,265 00	" .....	"
	Forward-Melfort Highway— Section D (NE. 31-20-19-2 to Southey).	18.00	18,310 00	" .....	"
7	Saskatoon-Alsack Highway— Section C (Harris to NE. 23-30-15-3).	27.50	28,200 00	" .....	"
	Section F (Kindersley to NE. 34-28-29-3).	37.00	30,500 00	" .....	"
8	Moosomin-Benito Highway— Section E (Kamsack to Pelly)....	21.00	22,990 00	" .....	"
9	Northgate-Preeceville Highway— Section G (Yorkton to Canora)....	28.00	26,820 00	" .....	"
10	Regina-Yorkton Highway— Section D (Melville to NE. 32-25-6-2).	17.50	18,300 00	" .....	"
11	Regina-Saskatoon Highway— Section C (Davidson to Bladsworth).	13.00	15,100 00	" .....	"
12	Saskatoon-Prince Albert Highway— Section A (NE. 32-36-5-3 to NE. 32-38-5-3).	13.00	57,080 00	" .....	"
	Section B (NE. 8-39-4-3 to Rosthern).	30.00	30,000 00	" .....	"
13	Redvers-Altawan Highway— Section A (Antler to Redvers)....	12.00	10,300 00	" .....	"
	Section B (Redvers to Carlyle)....	34.00	34,000 00	" .....	"
	Section C (Horizon to Verwood)....	26.00	31,986 00	" .....	"
14	Marchwell-Macklin Highway— Section C (Saltcoats to Yorkton)....	24.00	24,280 00	" .....	"
	Section L (Grandora to Asquith)....	12.00	12,120 00	" .....	"
15	Bangor-Watrous Highway— Section C (Goodeve to Jasmin)....	30.00	24,930 00	" .....	"
	Section E (Punnichy to Raymore)....	15.00	23,060 00	" .....	"
16	Maryfield-Regina Highway— Section A (NE. 12-10-30-1 to Fairlight).	15.00	12,700 00	" .....	"
17	Empress-Onion Lake Highway— Section F (N. Boundary twp. 48 to N. Boundary twp. 50).	12.00	15,700 00	" .....	"
18	Gainsborough-Trossachs Highway— Section G (NE. 24-2-13-2 to NE. 24-2-16-2).	18.00	51,648 50	" .....	"
	Section H (NE. 24-2-16-2 to North Boundary 31-3-17-2).	21.00	64,875 00	" .....	"

PROVINCE OF SASKATCHEWAN—*Concluded*  
(March 31, 1922)

Project No.	Location of Project	Mileage	Total Estimated Cost	Type of Construction	Widths
19	Kineaid-Hawarden Highway— Section F (Elbow to Hawarden) ..	20.00	\$ 17,710 00	Earth.....	20G-14P
20	Regina-Humboldt Highway— Section D (NE. 15-27-22-2 to Nokomis).	13.00	13,837 50	" .....	"
21	Robsart-Leader Highway— Section B (Maple Creek to NE. 35-15-26-3).	28.00	31,520 00	" .....	"
22	Welby-Bulyeay Highway— Section B (NE. 29-19-31-1 to NE. 34-19-4-2).	37.50	37,105 00	" .....	"
	Section D (NE. 12-20-7-2 to NE. 11-21-11-2).	37.00	34,150 00	" .....	"
	Section E (Balcarres to Dysart)...	33.00	32,380 00	" .....	"
23	Manitoba Boundary-Tonkin-Siding Highway— Section A (NE. 36-25-30-1 to Wroxton).	14.00	16,450 00	" .....	"
	Section B (Wroxton to Tonkin- Siding).	17.00	20,115 00	" .....	"
26	Glenrose Highway— Section A (NE. 1-46-17-3 to NE. 36-47-19-3).	23.00	30,300 00	" .....	"
		1,125.50	1,356,888 88		

Orig. Est. Cost      Revised Cost

*2 Section B	\$28,294.00	\$88,339.87
2 Section D	16,996.15	34,564.00
2 Section G	25,430.00	86,447.50

\*NOTE.—Placed under agreement last year.

LIST OF PROJECTS UNDER AGREEMENT BETWEEN THE DOMINION GOVERNMENT  
AND THE PROVINCE OF BRITISH COLUMBIA

(March 31, 1922)

Project No.	Location of Project	Mileage	Total Estimated Cost	Type of Construction	Widths
1	Alberni-Victoria Highway— Section B (Station 2.65 Metghosin Rd. to Station 74.00).	1.35	43,585 90	Cement concrete.....	16'P
	Station C (Nanaimo City Limits to Stat. 128.00 South Wellington Rd.).	2.42	84,088 50	Asphaltic concrete.....	16'P
4	Vancouver-Ladner Highway— Section C (Station 0.00 to Station 106.90).	2.03	77,352 00	Cement concrete.....	16'P
5	Ladner-New Westminster Highway— Section A (Station 3.00 to Station 160.00 Elec. Dist. Delta and Ladner).	2.97	192,473 00	6.46 Bitulithic.....	24G-16P
	Section C (Station 267.00 to Station 346.00 Elec. Dist. Delta and Ladner).	3.00		" .....	"
	Section B (Station 160.00 to Station 267.00 Elec. Dist. Delta and Ladner).	2.03	9,300 00	Cement concrete.....	17½G-14P
	Section D (Station 346.00 to Station 376.76 Elec. Dist. Delta and Ladner).	0.49	9,506 00	Bitulithic.....	24G-16P
9	Vancouver-Hope Highway— Section C (Station 448.00 to Station 522.00).	1.401	79,478 00	Gravel.....	30G-24P
	Section D (Station 522.00 to Station 608.00).	1.629	60,534 00	Cement concrete.....	30G-18P
13	Spences Br.-Princeton— Section A (From Aspen grove 25 miles South).	25.000	85,951 45	Gravel.....	16P
15	Kamloops-Osoyoos Highway— Section A (N. West Corner Lot 120 to South B'dy. Section 2, Twp. 23).	4.000	35,611 05	" .....	"
	Section B (Demonstration Farm to McIntyre Creek).	8.820	35,459 25	" .....	"
16	Cariboo Road— Section A (Fort George to Hixon Creek).	42.000	163,000 00	" .....	24G-16P
	Section B (Hixon Creek to Quesnel).	34.000	85,020 00	" .....	"
	Section C (Fort George to Summit Lake).	32.000	108,900 00	" .....	"
	Section D (Between Miles 214 and 219 North of Ashcroft).	5.000	26,845 00	" .....	16G-12P
22	Vernon-Revelstoke Highway— Section D (Three Valley P.O. to Taft).	10.070	125,307 95	" .....	20G-14P
23	Osoyoos-Crow's Nest Pass Highway— Section F (From Cascade, Easterly 15 miles).	15.000	201,485 00	Earth, gravel and stone.	
	Section G (From Easterly end Section F Easterly 13.25 miles).	13,250	198,555 00	" .....	
	Section H (Cranbrook District)...	6.620	106,915 00	Gravel.....	16G-14P
	Section I (Between Cranbrook and Moyles).	1.090	16,136 00	" .....	"
	Section J (Between Creston and Goatfell).	2.810	28,529 00	" .....	"
		216.980	1,877,732 10		

**STATEMENT OF MILEAGES BY PROVINCES  
OF FEDERAL AID HIGHWAY CONSTRUCTION  
COMPLETED**

Province	Under Agreement	Completed	Uncom- pleted
British Columbia.....	355.126	216.49	138.63
Manitoba.....	764.70	5. *	759.70
New Brunswick.....	1,237.20**	242.5**	994.4
Nova Scotia.....	207.46	134.23	73.23
Ontario.....	606.80	136.99	469.80
Prince Edward Island.....	181.25	45.5	135.75
Quebec.....	237.688	146.2	91.488
Saskatchewan.....	1,229.75	333.5	896.25
	4,819.984	1,260.41	3,559.574

\* In addition to work having received the final application of gravel, 117.7 miles received a first application, and 52.5 miles a second application.

\*\* This figure includes 389 miles between sections under construction, which require maintenance only.

The mileages given under the head "Uncompleted" include projects placed under agreement during the winter, and upon which work had not been commenced at the close of the fiscal year, 1921-22. For example in the province of Ontario, the mileage of Federal aid work actually under improvement at the close of the working season amounted to 338.40 miles only.

In general it may be observed that the procedure is to put in the permanent culverts, provide proper and sufficient drainage, follow with grading, and then put on a light coat of gravel or broken stone in order to permit the passage of traffic. When the whole has settled firmly, and the base brought to the required thickness, the finishing surface is applied.

Consequently the general practice is not to begin work at fixed points, and carry the project continuously to completion, but to work simultaneously at different points on long stretches of a through route, and develop it as required, providing temporarily for traffic during the interval.

**STATEMENT OF PROGRESS BY PROVINCES UNDER CANADA HIGHWAYS ACT, 1919 TO CLOSE OF  
1921-22**

Province	Projects under Agreement					Federal Aid	Federal Aid Payments
	Number of Projects	Number of Agreements	Mileage	Estimated Subsidizable Cost	Estimated Dominion Aid 40%		
Prince Edward Island.....	20	20	181.25	\$ 324,555 00	\$ 129,826 00	\$ 603,455 00	\$ 143,758 72
Nova Scotia.....	24	24	207.46	2,251,259 53	900,503 82	1,468,720 00	486,412 69
New Brunswick.....	19	19	1,237.20	2,950,600 00	1,180,240 00	1,163,845 00	438,303 74
Quebec.....	14	35	237.6878	2,638,641 75	1,055,456 71	4,748,420 00	540,217 99
Ontario.....	24	24	606.80	11,292,798 70	4,517,119 48	5,877,275 00	1,326,329 01
Manitoba.....	9	9	764.70	3,478,902 15	1,391,560 86	1,602,265 00	351,740 74
Saskatchewan.....	24	27	1,229.75	1,667,090 01	666,836 01	1,806,255 00	193,773 29
Alberta.....	13	20	355.126	2,938,598 75	1,175,439 50	1,477,810 00	453,472 99
British Columbia.....	147	178	4,819.9738	27,542,455 89	11,016,982 38	20,000,000 00	3,934,009 17

**INTERPROVINCIAL CONNECTIONS**

There are being constructed and proposed for construction with Federal aid, a number of interprovincial highways, as well as a limited number of branches, so as to form, to the south, international connections; and, to the north, inter-communications with the principal centres of population.

The international connections from east to west include the following: St. Stephen-Calais, Levis-Jackman, Montreal-Rouse's Point, Prescott-Ogdensburg, Niagara Falls, Ont.-Niagara Falls, N.Y., Windsor-Detroit, Emerson-St. Vincent, North Portal-Portal, Gate-way, B.C.-Gate-way, Mont., Rossland-Northport, Cloverdale-Blaine.

Proposed and constructed Federal aid projects make a complete circuit of the province of Nova Scotia; and, joining at Amherst, form an interprovincial connection with the roads of New Brunswick. Main trunk highways of New Brunswick pass through the principal agricultural and industrial sections, and connect with the similar highways running into Quebec, from Matapedia and Edmundston. Federal aid projects also belt the province of Prince Edward Island, and converge at Charlottetown. From Edmundston, N.B., a main trunk route leads to Riviere du Loup, and thence, along the south shore of the St. Lawrence river, passing through Levis and Ste. Angele, and a series of semi-rural communities to St. Lambert. Continuing north-erly to Montreal, this interprovincial route passes westerly to Cornwall, Ont., and thence via Prescott, Kingston, Toronto, Hamilton and London to Windsor.

As the Federal appropriation was limited in amount, and provision for heavy traffic on the main routes of the southern portion of the province was regarded as most urgent, no proposal could be made looking to the construction with Federal aid, of an improved highway between the Severn river, or Pembroke, through north-western Ontario, and the Manitoba boundary.

Through Manitoba, the outlines of two or three interprovincial highways with Saskatchewan, improved with gravel, are being formed. Similarly, Saskatchewan, Alberta and British Columbia are planning their Federal aid systems, so as to permit as far as possible modern traffic using their improved highways for long distance, as well as local travel.





